Power Electronic Applications

(Code : 22527)

(Elective)

Maharashtra State Board of Technical Education (MSBTE)

Semester V – Electrical Engineering Group (EE/EP/EU)

Strictly as per new revised 'I' Scheme w.e.f. academic year 2019-2020

J. S. Katre

M.E. (Electronics and Telecommunication)
Formerly, Assistant Professor
Department of Electronics Engineering
Vishwakarma Institute of Technology (V.I.T.), Pune.
Maharashtra, India

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J. S. Katre

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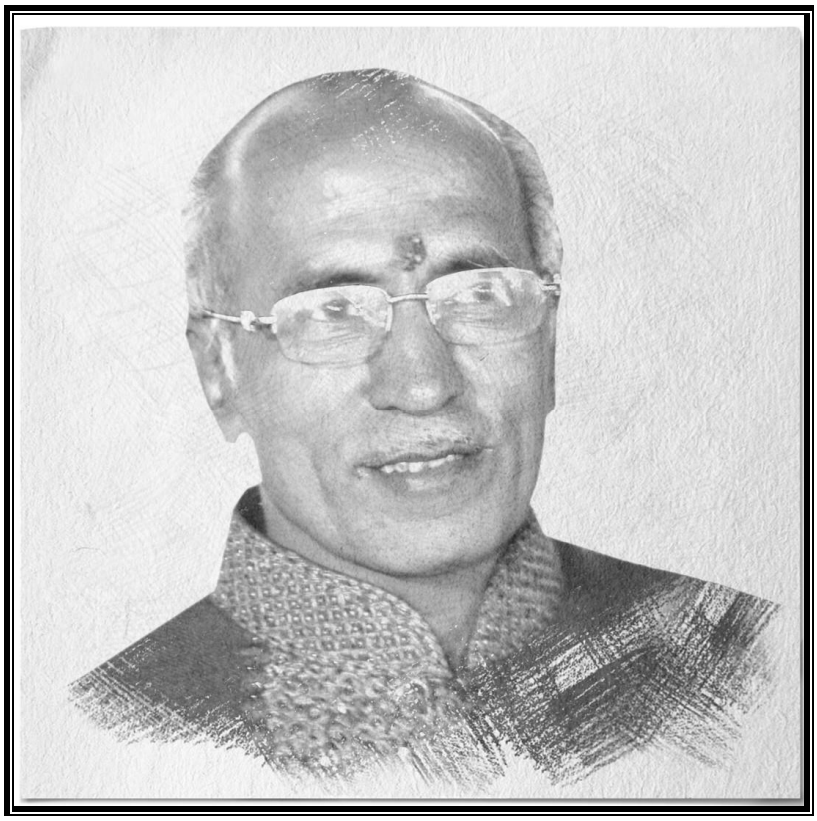
We dedicate this Publication soulfully and wholeheartedly,

in loving memory of our beloved founder director,

Late Shri. Pradeepji Lalchandji Lunawat,

who will always be an inspiration, a positive force and strong support

behind us.



"My work is my prayer to God"

- Lt. Shri. Pradeepji L. Lunawat

Soulful Tribute and Gratitude for all Your Sacrifices, Hardwork and 40 years of Strong Vision…

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Syllabus…

Power Electronic Applications : Sem. V (Electrical Engineering Group (MSBTE))

Unit-I

1. Modern Power Devices :

Power MOSFET and IGBT : Construction, Working, Transfer characteristics, Output characteristics, and application. SCR construction, Working, Transfer characteristics, Output characteristics, and application.

SIT ; Construction, Working, VI characteristics, and application. MCT : Construction, Working, VI characteristics and application. FCT : Construction, Working, VI characteristics, and application. **(Refer Chapter 1)**

Unit-II

2. Chopper Circuits :

DC Choppers : Types, Control strategies of chopper single quadrant, Two quadrant, Four quadrant chopper (Circuit diagram, operation with waveforms), Morgan chopper : Circuit diagram, Operation with waveforms. Jones choppers : Circuit diagram, Operation with waveforms. **(Refer Chapter 2)**

Unit-III

3. Inverter Circuits :

Classification : Voltage-driven and current-driven inverter. Transistor inverter, SCR inverters : Single-phase parallel inverter, Single-phase series inverter, Single phase bridge inverter description with circuits and waveforms. Three-phase bridge inverter description with circuits and waveforms. McMurray half bridge and full bridge inverters description with circuits and waveforms. McMurray-Bedford inverter description with circuits and waveforms and applications. **(Refer Chapter 3)**

Unit-IV

4. Dual Converters and Cyclo-converters :

Dual converters : Principle and types. Circulatory current free mode, Circulatory current mode dual converters, Cyclo-converter : Principle and types. Single phase to single phase and three phase Cyclo-converter : Operation with circuit and waveforms. **(Refer Chapter 4)**

Unit-V

5. Industrial Applications of Power Devices :

Static circuit breaker (DC and AC). High frequency heating : Induction heating and dielectric heating control. Electric welding control. Battery charger control. Battery charger control. AC voltage stabilizer type : Servo, Solid state and relay. Static VAR compensation system. Closed loop speed control method for DC and AC servo motor. Simulation : Chopper, Inverter and Cyclo-converter circuits. **(Refer Chapter 5)**

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Unit – I

Syllabus : Power MOSFET and IGBT : Construction, Working, Transfer characteristics, Output characteristics, and application. SCR construction, Working, Transfer characteristics, Output characteristics and application. SIT : Construction, Working, V-I characteristics, and application. MCT : Construction, Working, V-I characteristics, and application. FCT : Construction, Working, V-I characteristics, and application.

Unit – II

Syllabus : DC choppers : Types, Control strategies of chopper. Single quadrant, Two quadrant, Four quadrant, Chopper (Circuit diagram, Operation with waveforms). Morgan chopper : Circuit diagram, Operation with waveforms. Jones choppers : Circuit diagram, Operation with waveforms.

Syllabus : Classification : Voltage-driven and current-driven inverter, Transistor inverter, SCR inverters: Single-phase parallel inverter, Single-phase series inverter, Single-phase bridge inverter description with circuits and waveforms. Three-phase bridge inverter description with circuits and waveforms. McMurry half bridge and full bridge inverters description with circuits and waveforms. McMurry-Bedford inverter description with circuits and waveforms and applications.

Syllabus : Dual converters : Principle and types, Circulatory current free mode, Circulatory current mode dual converters, Cyclo-converter : Principle and types, Single phase to single phase and three phase Cyclo-converter : Operation with circuit and waveforms.

Syllabus : Static circuit breaker (DC and AC), High frequency heating : Induction heating and dielectric heating control, Electric Welding Control, Battery charger control, AC voltage stabilizer type : Servo, Solid state and relay. Static VAR compensation system, Closed loop speed control method for DC and AC servomotor, Simulation : Chopper, Inverter and Cyclo - Converter Circuits.

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